PITTSBURGH & CASTLE SHANNON RAILROAD,
WARRINGTON AVENUE BRIDGE
(Pittsburgh & Castle Shannon Railroad, Bridge No. 1004)
Overbrook Trolley Line, Crossing Warrington Avenue
Pittsburgh
Allegheny County
Pennsylvania

HAER NO. PA-410-A



PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
National Park Service
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HISTORIC AMERICAN ENGINEERING RECORD

PITTSBURGH & CASTLE SHANNON RAILROAD,
WARRINGTON AVENUE BRIDGE
(Pittsburgh & Castle Shannon Railroad, Bridge No. 1004)

HAER No. PA-410-A

Location: Overbrook Trolley Line, Crossing Warrington Avenue
Pittsburgh
Allegheny County, Pennsylvania

Quad: Pittsburgh West, Pennsylvania
UTM: 44.74600.584120

Date of Construction: 1928

Engineer: Pittsburgh Railways Company

Present Owner: Port Authority of Allegheny County
2235 Beaver Avenue
Pittsburgh, Pennsylvania 15233-1080

Present Use: Out of Service

Significance: The Warrington Avenue Bridge is one of four bridges which carried Pittsburgh Railways' trolley cars along the 6 mile route from Mount Washington to Castle Shannon.

Project Information: The Port Authority's Stage II Light Rail Transit Project proposes the in-place modernization of the Overbrook, Library, and Drake Trolley Lines. The proposed project will include the removal and replacement of the Warrington Avenue Bridge.

Shelley Birdsong, Historian
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The Warrington Avenue Bridge, located in the Eighteenth Ward of the City of Pittsburgh, crosses Warrington Avenue close to its intersection with Boggs Street near South Hills Junction. The current structure, erected in 1928 by the Pittsburgh Railways Company, carried interurban cars from Pittsburgh south to Castle Shannon before continuing to Washington and Charleroi. The final bridge inspection report, completed in 1992, provides a description of the current structure.

According to AWK Consulting Engineers, the current bridge is a two-track, open-deck, through girder bridge comprised of three simple spans. The bridge sits on a 26 degree skew with an 83'-10" center span and 6'-6" deep girders. The center span is supported on two steel bents that parallel the roadway. A steel column braced against the northern bent is used to support the extra span on the western girder. The approach spans are riveted to the center span. These spans are approximately 30' long with 4'-6" deep girders, supported by large stone masonry construction with concrete backwalls and mortar bearing pedestals. The western girder has an additional 19' span to compensate for the unusual abutment geometry. In addition, the south abutment wall runs parallel to the roadway, and the southwestern wing-wall runs parallel to the track. The north abutment is parallel to the roadway under the inbound track, and transverse to the roadway under the outbound track.[1]

Ten-inch wide flange steel stringers carry the rail loads to 16" wide flange steel floorbeams that span 14 feet. These stringers connect to the three riveted steel through girders in each span. Guard timbers are present on each side of the inbound and outbound tracks.[2] The structure has not been used since 1993 when the Overbrook Trolley Line was closed by the Port Authority of Allegheny County because of public safety issues. Currently, the bridge remains out of service.

The Warrington Avenue crossing was established in the 1860s.[3] When the Pittsburgh and Castle Shannon Railroad (P. & C.S.R.R.) built its route, the corridor's initial crossing appeared to be at-grade and was constructed near the bridge's current location. A later agreement between the Borough of Montooth, the West Liberty Street Railway Company, and the P. & C.S.R.R. Company initiated the removal of this at-grade crossing and subsequent bridge construction. The replacement, a single-tracked, steel overpass, was erected in 1900.

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[1]AWK Consulting Engineers, "Periodic NBIS Bridge Inspection Report--Warrington Avenue Bridge," April 1992.
[2]*Ibid.*
[3]J. Sutton Wall, *Second Geological Survey of Pennsylvania, Report on the Coal Mines of the Monongahela River Region from the West Virginia State Line to Pittsburgh,* (Harrisburg, Pennsylvania: Board of Commissions for the Second Geological Survey, 1884), K-179.

The West Liberty Street Railway Company erected the original 1900 structure. The historic record is not clear as to why this company constructed a bridge on the P. & C.S.R.R.'s right-of-way. While drawings for the original bridge do not exist, a series of correspondence in the 1910s describes the structure as follows:

> [T]his bridge crosses at a very long angle and the abutments for this bridge [are] built for a 40 foot street at right angles between the abutments. They therefore occupy part of the sidewalk of the 50 foot street. In addition there are columns on the sidewalk lines and columns in the center of the street. . . .The bridge was built in conformity with an agreement between the Borough of Montooth and the West Liberty Street Railway company dated October 23rd, 1900. . . .The Pittsburgh & Castle Shannon Railroad does not appear to have been made a party to this transaction, although of course it must have permitted this work to proceed, as it could not have been done without the knowledge of its officials.[4]

A letter, dated January 1916 to P.N. Jones, general manager of the Pittsburgh Railways Company, offered additional information about the bridge's development. According to this letter, there was a contract "between the Pittsburgh and Castle Shannon R.R. and the West Liberty St. Ry. covering the construction of the present bridge and [provided] that the West Liberty St. Ry. shall be at the expense of putting in the second track."[5] Yet, the bridge was not to be double tracked until Pittsburgh Railways began improving the route in 1905, after gaining control of the right-of-way, through a ninety-nine year lease.

In 1905, Pittsburgh Railways performed three major improvements on the structure. Initially, the company took measures to widen and electrify the line immediately. The first improvement was the laying of a third rail to accommodate Pennsylvania Broad Gauge trolley cars. The second capital improvement was detailed in Construction Order 512. This construction order provided for the "[l]aying of electric railway tracks along the right-of-way of the Pittsburgh and Castle Shannon Railroad from Castle Shannon to [a] point of connection with the Mount Wash. St. Ry. [for the] length of [the] route."[6] This resulted in the Warrington Avenue Bridge being retrofitted for electrical use, not the erection of a new structure. Therefore, the original structure stood from 1900 to 1928 when Pittsburgh Railways replaced the bridge.

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[4] Letter to P.N. Jones, General Manager of the Pittsburgh Railways Company, dated 10 December 1915, Historic Bridge Files, Agreement Files 920.5, Warrington Avenue Bridge Folder, Ways and Structure Division, Port Authority of Allegheny County, Pittsburgh, PA. (Hereinafter cited as the Warrington Avenue Bridge Files).
[5] Letter to P.N. Jones, General Manager, dated 31 January 1916, Warrington Avenue Bridge Files.
[6] Pittsburgh Railways Company, Ledger of Construction Orders, Description of Construction Order Number 512, located at the Miller Memorial Library, Pennsylvania Trolley Museum, Washington, Pennsylvania.

The retrofitting of the entire 6 mile route occurred between April 30, 1909, and December 31, 1910, according to Pittsburgh Railways records. The total cost for the renovation of the route was $112,584.59.[7]

Pittsburgh Railways' third improvement was the extension of the bridge's wing walls in 1916. In correspondence to P.N. Jones, the reconstruction is briefly described to include the installation of long wing walls to take in the slope of a planned double-track roadway. The plan, however, did not remove the center bent support from the vehicular roadway. The Department of Public Works addressed this issue with Pittsburgh Railways engineers when they requested the railroad "make a plan that provided for posts at the curb line and abutments at the property lines."[8] Plans for the construction of the new double-tracked bridge though, were not to come to fruition in the 1910s. The initial reason was the American involvement in World War I followed by the company going into receivership. The need for steel and other war materials caused Pittsburgh Railways to continue using the 1900 structure, and the lack of a company disposable income further stifled efforts to improve the 1900 bridge extensively. In order to maintain the older bridge, Pittsburgh Railways began a series of low cost improvements to the substructure of the bridge.

In 1919, the receivers focused attention on the track conditions of the Warrington Avenue Bridge. The company replaced the tracks with second-hand rails that company engineers considered to be in better condition. In addition, correspondence revealed that the Thomas Cronin Company constructed the wing wall extensions for the Warrington Avenue Bridge.[9] During the effort, Cronin advised the company to operate its cars slowly over the bridge while they extended the abutments and widened the actual structure. To support the superstructure, Cronin used a system of timbers close to where his crew cut into the then current abutments. The historical record does not discuss the completion date of these bridge improvements, but Pittsburgh Railways ignored earlier advice suggesting the elimination of the center line bent in the Warrington Avenue roadway. By 1924, the City of Pittsburgh Department of Public Works began requesting that Pittsburgh Railways design an alternative to the center bent support.[10]

The location of a bent in the center of Warrington Avenue threatened the safety of motorists. During 1919, the company installed red lights to alert motorists to the location of the center bent; however, these lights continually burned out, creating a hazard for motorists and trolleys alike. Public safety was the concern of the Department of Public Works, and in

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[7] *Ibid.*
[8] Letter to P.N. Jones dated 23 March 1916, Warrington Avenue Bridge Files.
[9] Harry Cronin to Pittsburgh Railways Company, letter dated 12 June 1919, Warrington Avenue Bridge Files.
[10] John D. Stevenson to William C. Boyd, letter dated 24 January 1924, Warrington Avenue Bridge Files.

response, the receivers ordered Pittsburgh Railways to install two sets of red lights on the bridge: one set of oil lamps, the other set electric.[11]

In 1925, when Pittsburgh Railways Company emerged from receivership,[12] plans were made for a second bridge construction. Pittsburgh Railways' engineers drew plans relating to the reconstruction and relocation of the Warrington Avenue Bridge. The plan was to change the angle upon which the bridge sat, thus safely shifting the bridge load and eliminating the center bent in Warrington Avenue. J.M. Larned, Engineer of Way for Pittsburgh Railways, discussed the cost of a new structure in a letter dated December 1925. He stated that the bridge's new location would affect the running of the Brookline Division and Beechview Division cars and make other construction necessary. With this new knowledge, the final planned alterations were to include the construction of retaining walls along the tracks, filling for the new location of the interurban tracks, and the building of new wing walls to support the outbound track after the interurban cars left the bridge. The new wing walls replaced the 1916 construction. The estimated cost was $18,180.[13]

The Pittsburgh City Council began asserting some pressure for the removal of the center pier at Warrington Avenue in March 1927. In a series of correspondence, the City Council, through the Department of Public Works, requested Pittsburgh Railways remove the traffic hazard and support columns located on the sidewalk area. Furthermore, the Department stated that "[t]he city has from time to time taken up this matter with your company but without results. The Department deems the encroachment of your structure on this street as constituting a menace to traffic and believes that immediate steps should be taken for the elimination of the obstructions by constructing a new bridge."[14] Pittsburgh Railways considered new bridge construction in its 1927 budget. [15]

Pressure from City Council initiated discussion surrounding the replacement of the Warrington Avenue Bridge. To avoid service interruption, plans were designed to allow for the continued operation of the old bridge until the new outbound bridge was completed and the tracks in place. Unlike the 1919 structure, the 1927 structure was to be a double-tracked bridge. The estimated cost of the new bridge, which was $18,180 in 1925, increased to $30,000 in 1927.

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[11]S.L. Tone to F. R. Phillips, letter dated 25 January 1924, Warrington Avenue Bridge Files.
[12]According to *Moody's Public Utilities*, the Pittsburgh Railways Company was considered out of receivership on February 1, 1924. John Moody, *Moody's Public Utilities, 1924*, (New York: Moody's Investor Service, 1924), 509.
[13]J.M. Larned to O. Williams, letter dated 30 December 1925, Warrington Avenue Bridge Files.
[14]Charles M. Reppert to Thomas Fitzgerald, letter dated 28 March 1927, Warrington Avenue Bridge Files.
[15]J.M. Larned to L.S.Russel, interoffice communication dated 25 October 1926, Warrington Avenue Bridge Files.

Engineers estimated an additional cost of $20,000 to realigning the tracks. Construction began in early 1928.[16]

The Homestead Iron Works Company (Homestead) won the bridge construction contract. The work specifications released on April, 16 1928 revealed Homestead was responsible for furnishing all supervision, labor, tools, and material, including excavation and masonry services. The Pittsburgh Railways Company requested the use of specific materials to include: Portland cement, Allegheny River gravel, Allegheny River sand, and 2" yellow pine timber forms. The forms were to be surfaced on one side and both edges to an even thickness and width for face work. Concrete was to be placed in a manner ensuring the most thorough compacting, and to prevent the separation of ingredients. Expansion joints were installed to avoid cracking cement during the expansion and contraction of the completed superstructure. During the construction, the interurban lines from Brookline and Beechview, which also used the bridge, were to remain fully operational.[17]

In 1928, Construction Order 763 was issued to allow for the removal of the "worn out and obsolete single-track bridge. . .[and] for the construction, in place, of a modern double track bridge completely spanning the roadway of Warrington Avenue."[18] Additionally, this construction order permitted the removal of the 1900 bridge and its approaches. Pittsburgh Railways instructed Homestead to first build the outbound bridge in such a manner as to avoid interfering with service. During the construction of the outbound bridge, the entire south abutment was to be built, and the old superstructure reinforced during the effort. Once the bridge was completed and the tracks installed, the 1900 structure was to be removed and the inbound bridge built. Furthermore, Homestead was to remove all of the existing abutments and retaining walls along Warrington Avenue and rebuild the substructure. The stone of the abutments was to be rough tool dressed to even the vertical face along the south building line along Warrington Avenue.

Also, the contractor was to install a waterproof canopy. The plans specified the canopy's installation between the street lines of Warrington Avenue and the outside girders. The canopy was to be drained into 4" standard cast iron downspouts installed at columns 1 to 5 inclusive.[19]

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[16]O. Williams to W.T. Rossell, letter dated 7 April 1927; W.T. Rossell to T. Fitzgerald, 12 April 1927, Warrington Avenue Bridge Files.

[17]Pittsburgh Railways Company, "Specifications for Retaining Wall along Pittsburgh and Castle Shannon Railroad near Warrington Avenue, Pittsburgh, PA," 16 April 1928, Warrington Avenue Bridge Files.

[18]Pittsburgh Railways Company, "Authority For Capital Improvements, No. 64-92, C.O. No. 763," dated 26 June 1928, Warrington Avenue Bridge Files.

[19]Pittsburgh Railways Company, "Specification for A Through Girder Bridge over Warrington Avenue Pittsburgh, PA," 27 June 1928, Warrington Avenue Bridge Files.

Homestead signed an agreement on August 10, 1928 to complete the work for $41,100. This cost included the construction of the retaining walls, the bridge, excavation, stone masonry, concrete, and steel.[20]

Homestead and the Fort Pitt Bridge Company fabricated the bridge's members. Homestead fabricated all materials for the bridge except the plate girders, which Fort Pitt supplied on site. Robert W. Hunt Company prepared a final structure inspection report on February 23, 1929, after Homestead completed construction. The company reported the newly constructed double-track, through-plate girder span over Warrington Avenue, had a total length of 201' 9" and a width of 27'5" from the center to the center of the girders. Homestead completed all bridge work by May 21, 1930. The final cost to Pittsburgh Railways was $65,051.98.[21] This is the structure that stands over Warrington Avenue today.

The importance of this trolley crossing is its age and the evolution of the crossing from the mid-nineteenth into the twentieth century. Beginning as an at-grade crossing, the construction of a wooden trestle and the final installation of a steel girder plate bridge illustrates an evolution in engineering technology and a growing interest in public safety. In addition, the significance of the bridge is in the engineering that took place in order to construct a bridge on a long angle and the support of the bridge's dead weight on a natural rock face at this location. The incorporation of a natural feature for the support of the structure in 1928, represents the ingenuity of Pittsburgh Railways' engineers. While the crossing has been out of service since 1993, the Port Authority of Allegheny County proposes to remove the Warrington Avenue Bridge, build a new structure, and reinitiate service on the crossing as part of its Stage II Light Rail Transit System Project.

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[20]Pittsburgh Railways Company, "Contract with Homestead Iron Works Company for Constructing a Reinforced Concrete Retaining Wall and Removing Present Walls and Bridge and Constructing a Steel Girder Bridge over Warrington Avenue, Pittsburgh, PA," dated 10 August 1928, Warrington Avenue Bridge Files.

[21]Pittsburgh Railways Company, "Completion Report," dated 27 June 1930; Pittsburgh Railways Company to Homestead Iron Works, "Contract to complete Canopy for Warrington Avenue Bridge," dated 6 November 1929; J.L. Ross to Homestead Iron Works, letter dated 12 December 1929. All located in the Warrington Avenue Bridge Files.

## Sources of Information

### Primary Resources

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Pittsburgh Railways Company Papers. Located at the Miller Memorial Library, Pennsylvania Trolley Museum, Washington, Pennsylvania.

### Secondary Resources

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### Maps

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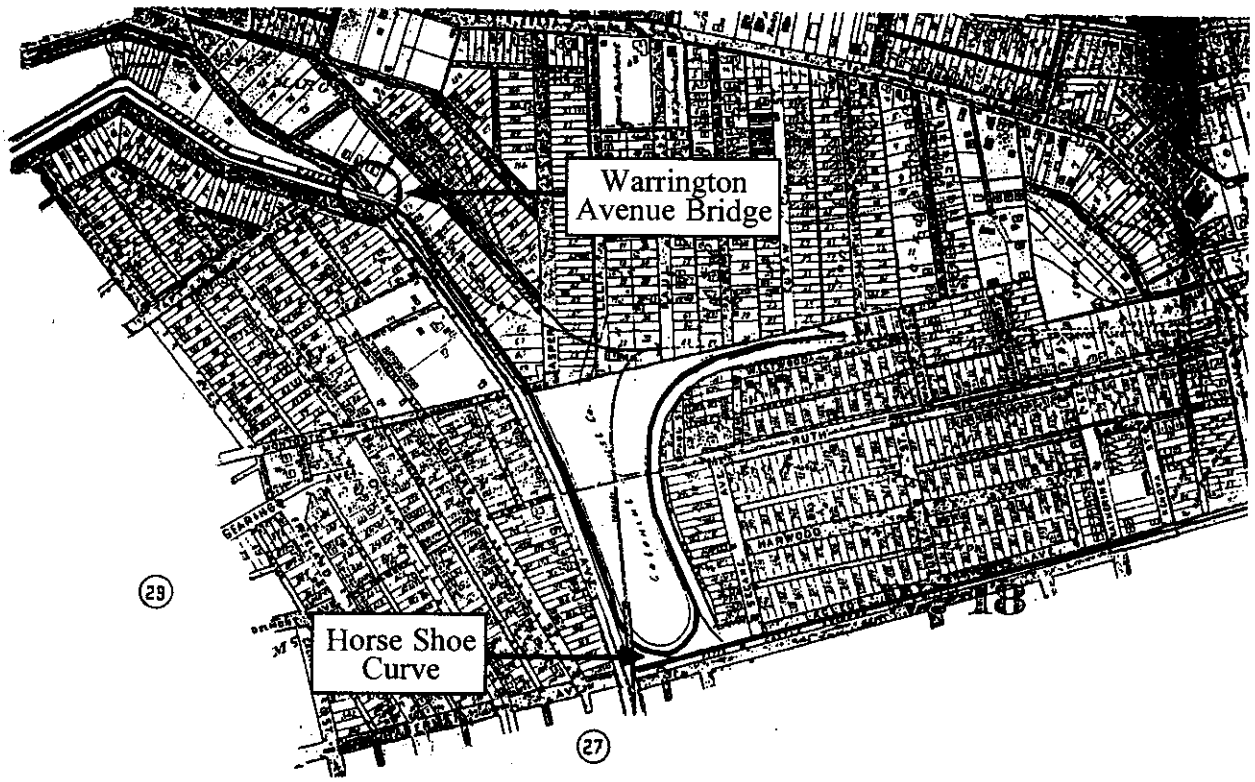
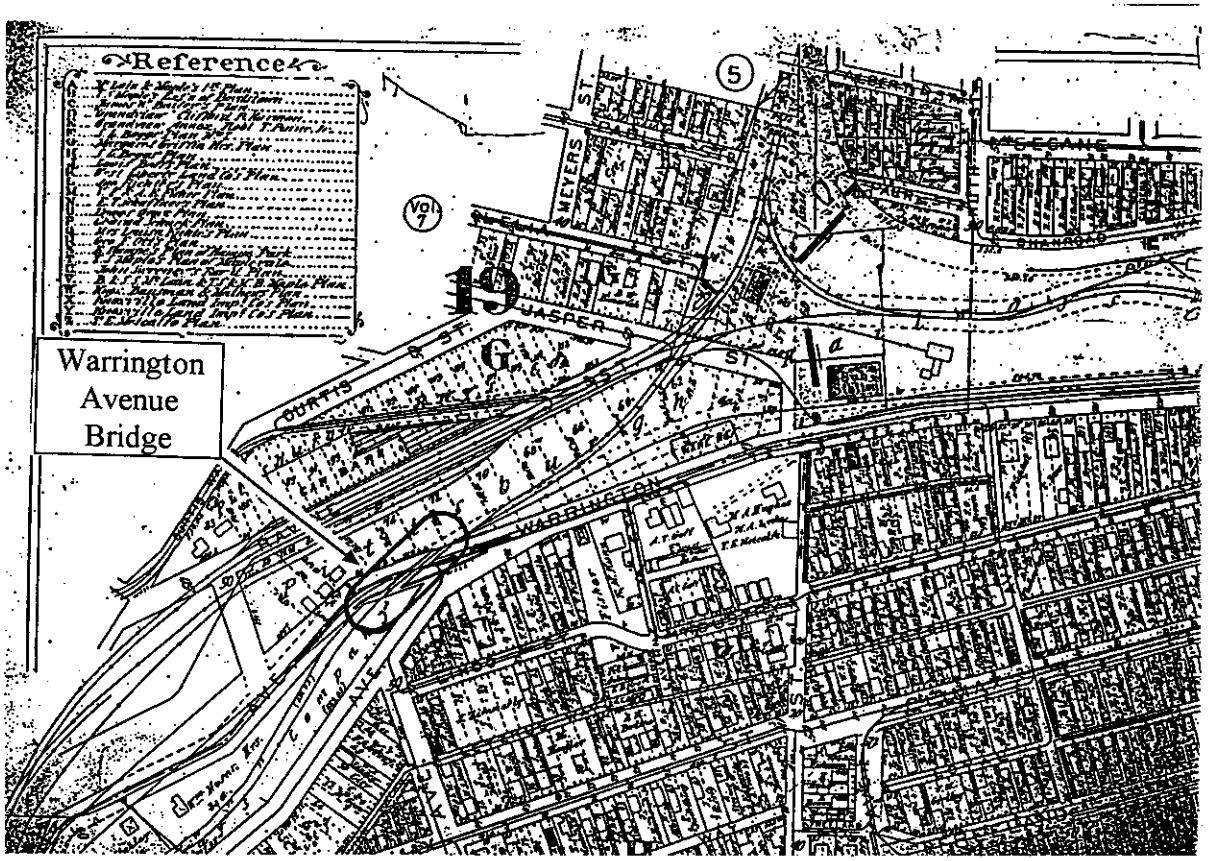



Scale 1" = 796 feet
Illustrating the Warrington Avenue Bridge in its Setting
Pittsburgh & Castle Shannon Railroad Company-Overbrook Trolley Line is Highlighted
Original Scale 1" = 300 feet
1910
Griffith Morgan Hopkins, Atlas of Greater Pittsburgh, Plate 30
(Philadelphia, Pennsylvania: G.M. Hopkins Company, 1910)




Scale 1" = 769 feet
Illustrating the Warrington Avenue Bridge in its Setting
Original Scale 1" = 300 feet
1916
Griffith Morgan Hopkins, *Maps of Pittsburgh Volume 6, Plate 12*
(Philadelphia, Pennsylvania: G.M. Hopkins Company, 1916)